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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,631	03/30/2004	Nassir Navab	2003P05012 US01	3464

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Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, NJ 08830

EXAMINER

ARTMAN, THOMAS R

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/812,631

Applicant(s)

NAVAB ET AL.

Examiner

Thomas R. Artman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 15-19 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-4 is/are allowed.
- 6) ☒ Claim(s) 5-13, 15-19 and 21-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 5, the amended limitation, “illuminating a target point with excitation light...image data at the target point” is indefinite for lacking sufficient structure for performing the function. As a result, the limitation does not structurally distinguish the claim over the prior art of record.

Claims 6-11 are rejected under this section by virtue of their dependency.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 5-9 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Ogura (US 6,731,718 B2).

Regarding claim 5, Ogura discloses an apparatus (Fig.38), including:

- a) a source of excitation light 84,
- b) an electromagnetic ray source 80 disposed relative to the source of excitation light,
- c) an electromagnetic ray transparent mirror 81 having a first surface disposed toward the light source and second surface disposed toward the electromagnetic ray source,
- d) a target location disposed towards the first surface of the electromagnetic ray transparent mirror for locating a target S and receiving the excitation light and the electromagnetic rays,
- e) an electromagnetic ray detector 87 disposed on an opposite side of the target location relative to the electromagnetic ray transparent mirror for detecting electromagnetic rays transmitted through the target,
- f) a second electromagnetic ray transparent mirror 81 having a light reflective surface disposed towards the target location, and
- g) a light detector 88 disposed towards the light reflective surface of the second electromagnetic ray transparent mirror for detecting light from the target.

With respect to claim 6, Ogura further discloses that the electromagnetic ray source emits X-rays.

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With respect to claim 7, Ogura further discloses that the source of excitation light emits optical or coherent light (visible or infrared, col.18, lines 43-48).

With respect to claim 8, Ogura further discloses that the light detector detects transmitted light from the detector (Fig.38).

With respect to claim 9, Ogura further discloses that there is a mirror 81 disposed towards the excitation light for at least one of reflecting and redirecting the excitation light.

With respect to claim 11, Ogura further discloses that the apparatus is rotated around a patient.

Claims 12, 13, 15-19 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Landi (US 5,644,616).

Regarding claims 12, 17, 18 and 23, Landi discloses a method (col.3, lines 13-59; col.5, lines 28-35; col.6, lines 45-46 and 54-55), including:

- a) defining a frame of reference,
- b) providing electromagnetic rays (X-rays from source 1, 46) to a target 15 relative to the frame of reference,
- c) detecting electromagnetic rays 49 transmitted by the target relative to the frame of reference,
- d) detecting light 49 from the target relative to the frame of reference,

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e) providing co-registered electromagnetic ray and light images 53 of the target to a user (Fig.7), and

f) providing excitation light 42 to the target relative to the frame of reference by:

g) capturing electromagnetic ray image data (col.3, lines 24-30),

h) identifying electromagnetic ray image data (coordinates) associated with the target (col.3, lines 24-30), and

i) projecting a beam of excitation light 42 responsive to the electromagnetic ray image data at the target (col.3, lines 30-37), where

j) the electromagnetic ray wavelength (X-rays) is shorter than the wavelength of the light (visible).

With respect to claims 13 and 19, the method further includes redirecting the light without redirecting the electromagnetic rays (mirror and/or excitation light source moves with target 15, the central, “identifiable ray” of the electromagnetic rays is left unchanged; Fig.6 and 7; col.3, lines 28-33).

With respect to claims 15 and 21, the method further includes redirecting the excitation light without redirecting the electromagnetic rays (mirror and/or excitation light source moves with target 15, the central, “identifiable ray” of the electromagnetic rays is left unchanged; Fig.6 and 7; col.3, lines 28-33).

With respect to claims 16 and 22, the method further includes capturing X-ray image data and identifying X-ray image data associated with the target (col.3, lines 33-37).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-7, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bani-Hashemi in view of Hollstein (US 2,474,421).

Regarding claim 5, Bani-Hashemi discloses an apparatus (Fig. 1), including:

a) a source of excitation light (ambient light),
b) an electromagnetic ray source 32 disposed relative to the source of excitation light,
c) an electromagnetic ray transparent mirror M1 having a surface disposed toward the electromagnetic ray source,

d) a target location disposed towards the first surface of the electromagnetic ray transparent mirror for locating a target 10 and receiving the excitation light and the electromagnetic rays,

e) an electromagnetic ray detector 20 disposed on an opposite side of the target location relative to the electromagnetic ray transparent mirror for detecting electromagnetic rays transmitted through the target,

f) a second electromagnetic ray transparent mirror M1 having a light reflective surface disposed towards the target location, and

g) a light detector 42 disposed towards the light reflective surface of the second electromagnetic ray transparent mirror for detecting light from the target.

Bani-Hashemi does not specifically disclose that the electromagnetic ray transparent mirror has a first surface that is disposed towards the excitation light. Since the excitation light is ambient light in the room, the mirror is enclosed within a collective housing with the X-ray source and the light detector.

Hollstein specifically teaches the use of an excitation light source 41, where the light is used for alignment of the X-ray beam and the object to be imaged/treated via a mirror 31 (col.4, lines 38-46). Hollstein teaches that there are situations where dark, obscure parts of the body need to be imaged/treated, where ambient light is insufficient for proper alignment purposes (col.2, lines 24-45). One skilled in the art, when incorporating the teachings of Hollstein (particularly in col.4, lines 39-46) into that of Bani-Hashemi, the X-ray transparent mirror M1, which already redirects the light from the target to the light detector, performs the same function and has the same alignment as the mirror of Hollstein. Therefore, the placement of the excitation source as taught by Hollstein in the device of Bani-Hashemi would inherently perform the function of redirecting the excitation source.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Bani-Hashemi to have the electromagnetic ray transparent mirror with a first surface disposed towards the excitation light in order to improve the accuracy and precision of alignment/imaging in conditions where the ambient light is insufficient, as taught by Hollstein.

With respect to claim 6, Bani-Hashemi further discloses that the electromagnetic ray source emits X-rays.

With respect to claim 7, Bani-Hashemi further discloses that the source of excitation light emits optical light.

With respect to claim 9, the combination of Bani-Hashemi/Hollstein has a mirror M1 disposed towards the excitation light for at least one of reflecting and redirecting the excitation light.

With respect to claim 10, Bani-Hashemi further discloses a mirror M2 disposed towards the light reflective surface of the second electromagnetic ray transparent mirror for at least one of reflecting and redirecting the light from the target to the light detector.

Allowable Subject Matter

Claims 1-4 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:
claim 1 is allowed for reasons as stated in the previous Office action, dated December 12th, 2006.

Claims 2-4 are allowed by virtue of their dependency.

The indicated allowable subject matter of original claims 17 and 23 has been withdrawn in view of the new grounds of rejection above.

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Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Polkus (US 6,478,462 B2) and McNeirney (US 6,267,502 B1) teach the practice of redirecting X-rays based upon coordinates determined from visible light imaging of the target.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas R. Artman
Patent Examiner

TR Artman
2/16/06

Edward J. Glick
EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER